UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/788,697	02/27/2004	Timothy R. Coulter	VRT0119US	6928

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)
Office Action Summary	10/788,697	COULTER ET AL.
	Examiner	Art Unit	
	Wilson Lee	2163	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>6/13/07 (RCE)</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1,2,4,7-12,17-20,22,25-29,31,32,35 and 37</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1,2,4,7-12,17-20,22,25-29,31,32,35 and 37</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>27 February 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08). Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

Continued Examination Under 37 CFR. 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued under 37 CFR 1.114, and fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/13/07 has been entered.

Response to Arguments

Applicant's arguments with respect to claims 1, 2, 4, 7-12, 17-20, 22, 25-29, 31, 32, 35, 37 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections – 35 U.S.C. 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 4, 7-12, 17-20, 22, 25-29, 31, 32, 35, 37 are rejected under 35 U.S.C. 102(e) as being anticipated by Bartfai et al. (US pub 2005/0081091).

Regarding Claim 1, Bartfai (US Pub 2005/0081091) discloses a method comprising:

- maintaining a synchronous copy (synchronously mirroring the data) of a
  data change log (data updates) at a primary node ("First Storage Unit
  100"), wherein said data change log (changed or updated data) at said
  primary node is associated with a primary data volume (storage space is
  an inherent feature) of said primary node (Abstract, fig. 1, paragraph
  0034); and

- said synchronous copy of said data change log is maintained at a data
  recovery node ("Second Storage Unit 102") (Abstract, fig. 1, paragraph
  0034);

- asynchronously updating a secondary data volume (volume of the Third
  Storage Unit) of a secondary node ("Third Storage Unit 104") using said
  synchronous copy (the data) of said data change log (paragraph 0013,
  lines 5-7, paragraph 0021).

Regarding Claim 2, Bartfai discloses that the secondary data volume (Volume of

"third storage unit") is updated in response to detecting a failure of the primary data

volume ("a failure associated with the first storage unit", paragraph 0068).

Regarding Claim 4, Bartfai discloses that said maintaining said synchronous

copy comprises:

- receiving a request ("I/O requests to write") to perform a write operation on
  said primary data volume (paragraph 0031);

- storing data associated with said write operation substantially simultaneously
  on said data change log ("write data... synchronously mirroring the data") and

said synchronous copy of said data change log in response to said receiving

(I/O requests) (paragraphs 0013, 0014, 0035, 0042-0051).

Regarding Claim 7, Bartfai discloses that said updating comprises:

- receiving a manual update initiation indication (I/O requests) (from the host

  110 to the first storage unit) (paragraph 0028);

- updating said secondary data volume (the storage space of the "third storage

  unit") using said real-time copy of said data change log in response to said

  receiving (write request) (paragraphs 0031, 0035, 0043, 0058).

Regarding Claim 8, Bartfai discloses that said synchronous copy of said data

change log comprises a plurality of entries; and said updating comprises:

- identifying an entry of said plurality of entries (inherent feature while the data

  being transferred or updated, the data will have entries to any storage units)

  as corresponding to an incomplete write operation ("outage of local site",

  "failure associated with the first storage unit") on said primary data volume

  (paragraphs 0058, 0068); and

- updating said secondary data volume (the storage space of the "third storage

  unit") using said entry (paragraphs 0058, 0068).

Regarding Claim 9, Bartfai discloses that said updating comprises:

- copying a block of data (inherent feature. Data can be in blocks) from said

  synchronous copy of said data change log to a staging log at said secondary

  node ("third storage unit"), said block of data comprising a plurality of entries

  (paragraphs 0058, 0068);

- applying each of said plurality of entries to a data change log at said

    secondary node ("third storage unit") in response to said copying (paragraphs

    0058, 0068); and

- updating said secondary data volume using said data change log at said

    secondary node (paragraphs 0058, 0068).

Regarding Claim 10, Bartfai discloses the method further comprising:

- detecting a recovery (recovery) of said primary data volume (paragraphs

    0068, 0074); and

- re-synchronizing (re-synchronization) said primary data volume (Volume of

    first storage unit 100) (paragraphs 0072, 0073) and said secondary data

    volume (Volume of the "third storage unit 104") (paragraph 0074) in response

    to said detecting.

Regarding Claim 11, Bartfai discloses a machine-readable medium having

comprising a plurality of instructions wherein said plurality of instructions when executed

cause implement a method comprising:

- maintaining a synchronous copy of a data change log at a primary node ("first

    storage unit"), wherein said data change log at said primary node is

    associated with a primary data volume of said primary node and said

    synchronous copy of said data change log is maintained at a data recovery

    node ("second storage unit") (abstract, paragraph 0027);

- asynchronously updating a secondary data volume of a secondary node

    ("third storage unit") using said synchronous copy (paragraph 0013, 0021).

Regarding Claim 12, Bartfai discloses that the secondary data volume is updated in response to detecting a failure of the primary data volume (paragraphs 0068, 0074).

Regarding Claim 14, Bartfai discloses that said maintaining said synchronous copy comprises:

- receiving a request to perform a write operation ("I/O requests to write") on said primary data volume (the storage space of the "first storage unit") (paragraphs 0028, 0031);

- storing data associated with said write operation substantially simultaneously ("write data... synchronously mirroring the data") on said data change log and said synchronous copy of said data change log in response to said receiving (I/O requests) (paragraphs 0013, 0014, 0035, 0042-0051).

Regarding Claim 17, Bartfai discloses that said synchronous copy of said data change log comprises a plurality of entries; and said updating comprises:

- identifying an entry of said plurality of entries (inherent feature while the being transferred or updated, the data will have entries to any storage units) as corresponding to an incomplete write operation ("outage of local site", "failure associated with the first storage unit") on said primary data volume (Abstract, paragraphs 0058, 0068, 0072-0074); and

- updating said secondary data volume (the storage space of the "third storage unit") using said entry. (paragraphs 0058, 0068, 0072-0074). .

Regarding Claim 18, Bartfai discloses that said updating comprises:

- copying a block of data (inherent feature. Data can be in blocks) from said synchronous copy of said data change log to a staging log at said secondary node, wherein said block of data comprises a plurality of entries (inherent feature while data enter to the third storage unit) (paragraphs 0058, 0068, 0072-0074);

- applying each of said plurality of entries (inherent feature while data enter to the third storage unit) to a data change log at said secondary node ("third storage unit") (0058, 0068, 0072-0074) in response to said copying; and

- updating said secondary data volume using said data change log at said secondary node ("third storage unit") (0058, 0068, 0072-0074).

Regarding Claim 19, Bartfai discloses a data processing system comprising:

- means for maintaining a synchronous copy of a data change log at a primary node ("first storage unit"), wherein said data change log at said primary node is associated with a primary data volume of said primary node (abstract, paragraph 0013); and

- said synchronous copy of said data change log is maintained at a data recovery node ("second storage unit") (abstract, paragraph 0027);

- means for asynchronously updating a secondary data volume of a secondary node ("third storage unit") using said synchronous copy of said data change log (paragraph 0013, 0021).

Regarding Claim 20, Bartfai discloses that the secondary data volume is updated

in response to detecting a failure of the primary data volume (paragraphs 0068, 0072-

0074).

Regarding Claim 22, Bartfai discloses that said means for maintaining said

synchronous copy comprises:

- means for storing data associated with a requested write operation (I/O

 requests) (paragraphs 0028, 0031) on said primary data volume substantially

 simultaneously on said data change log ("write data... synchronously

 mirroring the data") and said real-time copy of said data change log.

 (paragraphs 0013, 0014, 0035, 0042-0051).

Regarding Claim 25, Bartfai discloses that said synchronous copy of said data

change log comprises a plurality of entries; and said means for updating comprises:

- means for identifying an entry of said plurality of entries (inherent feature

 while the being transferred or updated, the data will have entries to any

 storage units) as corresponding to an incomplete write operation ("outage of

 local site", "failure associated with the first storage unit") on said primary data

 volume entry (Abstract, paragraphs 0058, 0068, 0072-0074), and

- means for updating said secondary data volume (the storage unit of the "third

 storage unit") using said entry (paragraphs 0058, 0068, 0072-0074).

Regarding Claim 26, Bartfai discloses that said means for updating comprises:

- means for copying a block of data (inherent feature. Data can be in blocks)

 from said synchronous copy of said data change log to a staging log at said

secondary node, said block of data comprising a plurality of entries (paragraphs 0058, 0068, 0072-0074);

- means for applying each of said plurality of entries (inherent feature while data enter to the third storage unit) from said staging log to a data change log at said secondary node ("third storage unit") (0058, 0068, 0072-0074); and

- means for updating said secondary data volume using said data change log at said secondary node ("third storage unit") (0058, 0068, 0072-0074).

Regarding Claim 27, Bartfai discloses a data processing system comprising:

- a storage element to store a synchronous copy of a data change log at a primary node ("first storage unit"), wherein said data change log at said primary node is associated with a primary data volume of said primary node (paragraph 0027, abstract); and

- a recovery module configured to asynchronously update a secondary data volume of a secondary node ("third storage unit") (through "second storage unit") using said synchronous copy of said data change log (paragraph 0013, 0021).

Regarding Claim 28, Bartfai discloses that the recovery module updates the secondary data volume in response to a failure ("outage", "failure") of said primary data volume (paragraphs 0068, 0074).

Regarding Claim 29, Bartfai discloses the data processing system further comprising:

- a volume management module configured to mirror data to be written to said

data change log to said synchronous real time copy of said data change log (abstract,

paragraphs 0058, 0059).

Regarding Claim 31, Bartfai discloses that

-   the synchronous copy of said data change log comprises a plurality of entries

    (inherent feature while the being transferred or updated, the data will have

    entries to any storage units) (Abstract, paragraphs 0058, 0068); and

-   said recovery module comprises a failover management module configured to

    identify an entry of said plurality of entries (inherent feature while the being

    transferred or updated, the data will have entries to any storage units) as

    corresponding to an incomplete write operation ("outage of local site", "failure

    associated with the first storage unit") on said primary data volume and

    update said secondary data volume using said entry (Abstract, paragraphs

    0058, 0068).

Regarding Claim 32, Bartfai discloses that said recovery module comprises:

- a failover management module (when outage or failure at the first storage unit

occurs) configured to copy a block of data comprising a plurality of entries from said

real-time copy of said data change log to a staging log at said secondary node ("third

storage unit") (paragraphs 0058, 0059).

Regarding Claim 35, Bartfai discloses a method comprising:

-   maintaining a synchronous copy of a data change log at a primary node,

    wherein said data change log at said primary node is associated with a

primary data volume of said primary node ("first storage unit") (abstract,

paragraphs 0027, 0061); and

- said synchronous copy of said data change log is maintained at a data

recovery node ("second storage unit") (abstract, paragraph 0027); and

- asynchronously replicating data to be written to said primary data volume

from said primary node ("first storage unit") to said secondary node ("third

storage unit") through second storage unit (paragraph 0013, 0021).

Regarding Claim 37, Bartfai discloses the method further comprising:

- detecting a failure of said primary data volume (the storage space of the "first

storage unit") (paragraphs 0068, 0074); and

- updating a secondary data volume of said secondary node ("third storage

unit") using said synchronous copy of said data change log in response to

said detecting (paragraphs 0068, 0072-0074).

Correspondence

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Examiner Wilson Lee whose telephone number is (571)

272-1824.

Papers related to the application may be submitted by facsimile transmission.

Any transmission not to be considered an official response must be clearly marked

"DRAFT".   The official fax number is (571) 273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Retrieval (PAIR) system. Status information for published

applications may be obtained from either Private PAIR or Public PAIR. Status

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have questions on access to the Private PAIR system, contact the Electronic Business

Center (EBC) at 866-217-9197 (toll-free).

Wilson Lee
Primary Examiner
U.S. Patent & Trademark Office

9/4/07